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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/585,495	10/30/2006	Yuriy Mikhaylik	57519.00173	4187

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EXAMINER	
WILLS, MONIQUE M	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/585,495	MIKHAYLIK, YURIV	
	Examiner	Art Unit	
	Monique M. Wills	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 July 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 July 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-3, 5, 6, 7-12, 14-15, 19-24, 27-33 & 36 rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claim1, 3-9, 12-14, 18, 39, 41 & 45 of U.S. Patent No. 7, 354,680. Although the conflicting claims are not identical, they are not patentably distinct from each other because 7, 354, 680 claims a cell comprising a cathode electroactive sulfur-containing material' an anode comprising lithium; an nonaqueous electrolyte, wherein the electrolyte includes acyclic ethers, cyclic ethers, polyethers, and sulfones, a lithium salt and N-O additives including lithium nitrite, potassium nitrite, cesium nitrate and ammonium nitrate.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 9-12 & 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The concentration unit "m" is of uncertain terms, rendering the claims vague and indefinite. The term "m" usually denotes length in meters. An appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-14 & 16-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Visco et al. U.S. Pat. 5,822,812 in view of Visco et al. U.S. Pat. 6,432,584.

With respect to **claims 1 & 27**, Visco teaches an electrochemical cell comprising: (a) a cathode comprising an electroactive sulfur-containing material (col. 7, lines1-5) ; (b) an anode comprising lithium (col. 6, lines 65-68); and (c) a nonaqueous electrolyte (col. 7, lines 1-5), wherein the electrolyte comprises: (i) cyclic ethers of tetrahydrofuran (col. 4, lines 10-20), polyethers, and sulfones; and a N--O additive, including $LiNO_3$. See

column 11, lines 60-65. The tuning additive $LiNO_3$ may be added to the electrolyte (See column 13, lines 31-33 & col. 14, lines 61-62). With respect to **claims 2, 3, 5 & 28-30**, the one or more N--O additives an inorganic nitrate. See column 11, lines 60-68. With respect to **claim 14**, the cyclic ether includes tetraydrofuran. See column 10, lines 65-68. With respect to **claims 17-18**, Visco teaches a sulfur positive electrode. It would be reasonable to expect the electrode to include elemental sulfur containing at least 75% by weight sulfur. With respect to **claim 19**, the anode is lithium metal. See column 6, lines 65-68. With respect to **claims 20 & 33**, a separator is interposed between the electrodes. See column 7, lines 1-5. With respect to **claims 21 & 36**, the electrochemical materials are in a battery pack (col. 1, lines 20-30). With respect to **claim 22,** the N--O additive is lithium nitrate. See column 11, lines 60-65. With respect to **claims 26 & 35**, the N—O additives was added to the cathode. See column 14, lines 60-68 and col. 13, lines 30-35, wherein the tuning additive is added with a sulfur-based additive. The combination of additives may be included in the anode, cathode or electrolyte. With respect to **claim 16**, the electrolyte solvent includes sulfolane. See column 10, lines 50-55.

Visco does not expressly disclose: the N-O additive in the electrolyte with a concentration of 0.02 to 2.0m (**claims 9-12 & 31);** adding the N—O additive to the separator (**claims 25 & 34)**; organic nitrate additives such as nitromethane (**claims 4 & 6)** lithium salts of $LiN(CF_3SO_2)_2$ (**claims 7 & 8, 32)**; dioxolane and dimethoxyethane (**claims 13, 23-24**) .

However Visco, 6,453,584 teaches a lithium -sulfur cell (col. 13, lines 35-45) comprising combinations of nitromethane, dimethoxymethane, dioxolane. The reference also teaches the conventionality of lithium trifluoromethanesulfonimide ($LiN(CF_3SO_2)_2$. See column 14, lines 40-45.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ the conventional electrolyte solvent mixtures and lithium trifluoromethanesulfonimide because the selection of a known material based on its suitability for its intended use supported aprima facie obviousness determination in Sinclair & Carroll Co. v. InterchemicalCorp., 325 U.S. 327, 65 USPQ 297 (1945) **(claims 4, 6, 7-8, 13 & 23-24, 32).**

With respect to **claims 9-12 & 31**, although clarity exists with respect to the term "m", it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to vary the concentration of the N-O additive in the electrolyte, in order to optimize the effect to overcharge protection voltage. See column 3, lines 15-20.

With respect to **claims 25 & 34**, it would have been obvious to the skilled artisan to add the N--O additive to the separator in order to increase overcharge protection in the cell. It is well known in the art to added overcharge protection additives to all electrochemical constituents. Further, the reference clearly contemplates adding N-O materials to the anode, cathode and electrolyte, it would be obvious to further add the material to a separator to further overcharge protection properties.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Visco et al. U.S. Pat. 5,822,812 in view of Visco et al. U.S. Pat. 6,432,584 and further in view of Lauck U.S. Pat. 3,915,743.

Visco '812 in view of Visco'584 teaches a lithium-sulfur cell as described in the rejection recited hereinabove.

The combination of references teach the conventional employment of dimethoxymethane (col. 14, lines 25-40, Visco '584), but is silent to a diethylene glycol dimethly ether electrolyte.

However, Lauck teaches the equivalence of diethylene glycol dimethl ether and dimethoxymethane as electrolyte solvents for use in lithium-sulfur cells. See Example 5.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the instant invention was made to employ diethylene glycol dimethl ether instead of dimethoxymethane, because Lauck teaches the equivalence of the electrolyte solvents in the art and thus, one of ordinary skill in the art would have found it obvious to substitute diethylene glycol dimethly ether for dimethoxymethane.

Conclusion

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Monique Wills whose telephone number is (571) 272-1309. The Examiner can normally be reached on Monday-Friday from 8:30am to 5:00 pm.

If attempts to reach Examiner by telephone are unsuccessful, the Examiner's supervisor, Patrick Ryan, may be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-

direct.uspto.gov.Should you have questions on access to the Private PAIR system,

contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Monique M Wills/
Examiner, Art Unit 1795

/PATRICK RYAN/
Supervisory Patent Examiner, Art Unit 1795